UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION I
ONE CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES PURSUANT TO THE CLEAN WATER ACT (CWA)

NPDES PERMIT NUMBER: **MA0004782**

NAME AND MAILING ADDRESS OF APPLICANT:

Citgo Petroleum Corp.
385 Quincy Avenue
East Braintree, MA 02184

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Citgo Petroleum Corp.
385 Quincy Avenue
East Braintree, MA 02184

RECEIVING WATER(S): **Weymouth Fore River (MA74-14)**

RECEIVING WATER CLASSIFICATION(S): **SB**

SIC CODE: **5171 Bulk Petroleum Storage**

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I. Proposed Action, Type of Facility, and Discharge Location

The above applicant has applied to the U.S. Environmental Protection Agency (EPA) for re-issuance of a National Pollutant Discharge Elimination System (NPDES) permit to discharge treated storm water into the designated receiving water. The Existing Permit was signed October 31, 2002 and became effective on the date of signature. This permit expired October 31, 2006. EPA received a completed permit renewal application from CITGO dated April 20, 2006. Since the permit renewal application was deemed timely and complete by EPA, the permit has been administratively continued.

The CITGO Petroleum facility, which is located in East Braintree, Massachusetts, (Attachment A) is engaged in the receipt, storage, and distribution of petroleum products. The spectrum of fuels handled by this facility consists of diesel fuel, kerosene, No. 2 Fuel Oil, several grades of gasoline, and ethanol. The NPDES discharge consists of treated storm water runoff from pervious and impervious surfaces, intermittent hydrostatic testing water, and extracted remediated ground water. The combined effluent is discharged to the Weymouth Fore River through Outfall 001. Outfall 002 is an internal outfall discharging remediated ground water to external Outfall 001.

II. Description of Discharge

A quantitative description of the effluent parameters based on recent discharge monitoring reports (DMRs) is shown on Attachment B of this fact sheet.

III. Receiving Water Description

Outfall 001 discharges into the Weymouth Fore River (MA74-15), which is part of the Boston Harbor watershed and the Weymouth and Weir River sub-watersheds. The Weymouth Fore River is classified as a Class SB water by the Massachusetts Department of Environmental Protection (MassDEP). The Massachusetts Surface Water Quality Standards, 314 Code of Massachusetts Regulations ("CMR") 4.05(4) (b) state that Class SB waters have the following designated uses: *These waters are designated as habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation. In approved areas they shall be suitable for shellfish harvesting with depuration (Restricted Shellfish Areas). These waters shall have consistently good aesthetic value.*

Section 303(d) of the Federal Clean Water Act (CWA) requires states to identify those waterbodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such require the development of total maximum daily loads (TMDL). The 2006, 303(d) report states that the Weymouth Fore River (MA74-14), from Route 53 Braintree to mouth (eastern point at Lower Neck, Weymouth and westen point at Wall Street on Houghs Neck, Quincy), is not attaining water quality standards due to pathogens.

MassDEP is required under the CWA to develop a Total Maximum Daily Load (TMDL) for a water body once it is identified as impaired. A TMDL is essentially a pollution budget designed

to restore the health of a water body. A TMDL first identifies the source(s) of the pollutant from direct and indirect discharges in order to next determine the maximum amount of pollutant (including a margin of safety) that can be discharged to a specific water body while maintaining water quality standards for designated uses. It then outlines a plan to meet the goal.

A TMDL has not yet been developed for the Weymouth Fore River. In the interim, EPA is developing the conditions for this permit based on a combination of technology based standards, water quality based standards, and anti-degradation provisions. Based on the nature of the discharges for Citgo Petroleum, they are not expected to contribute to the existing impairments due to pathogens. However, if a TMDL developed in the future identifies that the discharge from the facility is causing or contributing to the non-attainment of surface water quality criteria, the permit may be re-opened.

IV. Limitations and Conditions

The effluent limitations of the draft permit, the monitoring requirements, and any implementation schedule (if required) may be found in the draft permit.

V. Permit Basis: Statutory and Regulatory Authority

The Clean Water Act (CWA) prohibits the discharge of pollutants to waters of the United States without a NPDES permit unless such a discharge is otherwise authorized by the CWA. The NPDES permit is the mechanism used to implement technology and water quality-based effluent limitations and other requirements including monitoring and reporting. This Draft NPDES permit was developed in accordance with various statutory and regulatory requirements established pursuant to the CWA and applicable State regulations. During development, EPA considered the most recent technology-based treatment requirements, water quality-based requirements, and all limitations and requirements in the current/existing permit. The regulations governing the EPA NPDES permit program are generally found at 40 CFR Parts 122, 124, 125, and 136. The general conditions of the Draft Permit are based on 40 CFR §122.41 and consist primarily of management requirements common to all permits. The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308(a) of the CWA in accordance with 40 CFR §122.41(j), §122.44(i) and §122.48.

A. Technology-Based Requirements

Subpart A of 40 CFR §125 establishes criteria and standards for the imposition of technology based treatment requirements in permits under Section 301(b) of the CWA, including the application of EPA promulgated effluent limitations and case-by-case determinations of effluent limitations under Section 402(a)(1) of the CWA.

Technology-based treatment requirements represent the minimum level of control that must be imposed under Sections 301(b) and 402 of the CWA (See 40 CFR §125 Subpart A) to meet best practicable control technology currently available (BPT) for conventional pollutants and some metals, best conventional control technology (BCT) for conventional pollutants, and best available technology economically achievable (BAT) for toxic and non-conventional pollutants.

In general, technology-based effluent guidelines for non-POTW facilities must be complied with as expeditiously as practicable but in no case later than three years after the date such limitations are established and in no case later than March 31, 1989 [See 40 CFR §125.3(a)(2)]. Compliance schedules and deadlines not in accordance with the statutory provisions of the CWA can not be authorized by a NPDES permit.

Storm water discharges from activities associated with petroleum bulk stations and terminals must satisfy best conventional technology (BCT) and best available technology (BAT) requirements and must comply with more stringent water quality standards if BCT and BAT requirements are not adequate. On September 25, 1992, EPA promulgated through its General Permit for Storm Water Discharge Associated with Industrial Activity, that the minimum BAT/BCT requirement for storm water discharges associated with industrial activity is a Storm Water Pollution Prevention Plan (SWPPP) [57 FR, 44438]. In the absence of applicable technology-based effluent guidelines, the permit writer is authorized under Section 402(a)(1)(B) of the CWA to establish effluent limitations on a case-by-case basis using Best Professional Judgement (BPJ).

B. Water Quality-Based Requirements

Water quality-based criteria are required in NPDES permits when EPA and the State determine that effluent limits more stringent than technology-based limits are necessary to maintain or achieve state or federal water-quality standards (See Section 301(b) (1)(C) of the CWA). Water quality-based criteria consist of three (3) parts: 1) beneficial designated uses for a water body or a segment of a water body; 2) numeric and/or narrative water quality criteria sufficient to protect the assigned designated use(s) of the water body; and 3) anti-degradation requirements to ensure that once a use is attained it will not be degraded. The Massachusetts State Water Quality Standards, found at 314 CMR 4.00, include these elements. The State Water Quality Regulations limit or prohibit discharges of pollutants to surface waters and thereby assure that the surface water quality standards of the receiving water are protected, maintained, and/or attained. These standards also include requirements for the regulation and control of toxic constituents and require that EPA criteria, established pursuant to Section 304(a) of the CWA, be used unless site-specific criteria are established. EPA regulations pertaining to permit limits based upon water quality standards and state requirements are contained in 40 CFR §122.44(d).

Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts. The State of Massachusetts has a similar narrative criteria in their water quality regulations that prohibits such discharges [See Massachusetts 314 CMR 4.05(5)(e)]. The effluent limits established in the Draft Permit assure that the surface water quality standards of the receiving water are protected, maintained, and/or attained.

C. Anti-Backsliding

EPA's anti-backsliding provision as identified in Section 402(o) of the Clean Water Act and at 40 CFR §122.44(l) prohibits the relaxation of permit limits, standards, and conditions unless the

circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued. Anti-backsliding provisions apply to effluent limits based on technology, water quality, BPJ and State Certification requirements. Relief from anti-backsliding provisions can only be granted under one of the defined exceptions [See 40 CFR §122.44(l)(i)].

D. Anti-Degradation

Federal regulations found at 40 CFR Section 131.12 require states to develop and adopt a statewide antidegradation policy which maintains and protects existing instream water uses and the level of water quality necessary to protect the existing uses, and maintains the quality of waters which exceed levels necessary to support propagation of fish, shellfish, and wildlife and to support recreation in and on the water. The Massachusetts Antidegradation Regulations are found at 314 CMR 4.04.

The Draft Permit includes new monitoring requirements for PAHs, new limits for pH and more stringent limits for Benzene and MTBE. Given the new stringent permit effluent limits and monitoring requirements, it is likely that the facility will not increase its loading to the receiving water compared to its existing operations. EPA anticipates that MassDEP shall make a determination that there shall be no significant adverse impacts to the receiving waters and no loss of existing uses as a result of the discharge authorized by this permit, and that no additional antidegradation review is warranted at this time.

VI. Explanation of the Permit's Effluent Limitation(s)

A. Facility Information

CITGO Petroleum Corporation is a bulk oil storage facility that handles diesel fuels, kerosene, No. 2 Fuel Oil, several grades of gasoline, and ethanol. It is located on the western shore of the Weymouth Fore River in East Braintree, MA and covers approximately 62 acres (see Attachment C). The facility consists of three principal areas: the marine vessel dock, the truck loading racks and the tank farm. Off-loading practices from the marine vessel dock to the facility are regulated by the Coast Guard and are not covered under this permit.

The truck loading rack area consists of the main office building, an employee parking lot, and 8 loading racks. The truck loading area is used for transfer of petroleum products to trucks for distribution, and vehicular traffic. No fueling or washing of vehicles or equipment occurs in this area. A slight rise in the asphalt surrounding the loading rack contains all spills and water run-off from the truck rack transfer area; these flows are directed to the truck rack oil/water separator (OWS 3). The roof of the truck loading rack has a slight overhang to minimize the amount of storm water entering the truck rack drains underneath the loading racks. Roof run off is directed to the raised area surrounding the loading racks, which flows to the 001 outfall main oil/water separator (OWS 1).

There are two active ground water remediation systems on-site. One system is covered under the Remediation and Miscellaneous Contaminated Sites General Permit (RGP). Ground water

discharged under this permit is from the eastern portion of the facility. The second ground water remediation system is covered under this individual NPDES permit. This system treats the area surrounding the truck loading rack and is described by the Existing Fact Sheet as follows:

> *On June 17, 1993 pursuant to Title 40 of the Code of Federal Regulations, Part 122.3(d), an exclusion from the requirement for a permit under the National Pollutant Discharge Elimination System (NPDES) was issued to Citgo Petroleum Corporation by the EPA Emergency Response Section, so that a recovery and treatment system could begin operations in a timely fashion. The Citgo terminal presently operates this remediation system adjacent to the loading rack along Quincy Avenue. A series of groundwater recovery wells pump product and water to a remediation system where separation, collection, treatment and discharge occur.*

The separation, collection, and treatment system consists of a carbon adsorption system coupled with air strippers, particulate filters and the remediation oil/water separator (OWS 2).

The tank farm is used for storage of petroleum products transferred from ships and barges to storage within the tank farm. It includes 18 vertical above ground bulk storage tanks that are used to store gasoline, diesel fuels, kerosene, No. 2 fuel oil, ethanol, and fuel additives. These tanks range in size from 40,000 to 116,000 barrels (bbls). Mixing of the petroleum products and additives is a closed system that occurs within the fuel lines. Approximately, once every ten years, tank(s) are taken out of service for inspection and repairs. If required, these tanks are tested using hydrostatic test water before returning to service.

There was at least one hydrostatic test water discharge reported at the facility since the issuance of the Existing Permit. Discharge monitoring and reporting were conducted for these testing events in accordance with the procedures described in Part I.A.5 of the Existing Permit. Water from the Weymouth Fore River was used as the source of water for these tests. Results from the testing of the hydrostatic test water shows conformance with the requirements and conditions identified in Part I.A.5 of the Existing Permit. CITGO Petroleum has indicated that all tank bottom water is consolidated and hauled off-site by a licensed waste hauler(s) for treatment and disposal elsewhere.

Secondary containment for the tank farm is provided through the use of earthen berms surrounding each bulk storage tank. According to CITGO, the secondary containment has been sized to hold at least 110 to 130 percent of the largest tank's storage capacity plus an added volume to hold any fire-extinguishment chemicals, water and/or precipitation. These berms help prevent any potentially spilled petroleum products from migrating from one containment area to another or into any surrounding waterways. Drainage from around each bulk storage tank to the 001 Outfall main oil/water separator (OWS 1) is controlled by either manual pumps or valves.

B. Permitted Outfalls

This Draft Permit authorizes the discharge of storm water runoff, hydrostatic test water, and remediated ground water from Outfall 001. The Draft Permit also establishes an internal outfall stream (Outfall 002) which will discharge treated ground water into the storm water conveyance

system for Outfall 001. The internal outfall stream, along with its respective effluent limits was established in the Draft Permit to minimize the potential impacts of dilution with storm water in accordance with 40 CFR §122.45(h). For a Water Line Diagram, refer to Attachment D.

1. Outfall 001

CITGO is permitted to discharge treated storm water, hydrostatic test water, and remediated ground water through Outfall 001. Storm water for the facility is collected from underneath the truck loading rack and from the surrounding area and tank farm. A slight rise in the asphalt surrounding the loading rack contains all spills and water run-off from the truck rack transfer area; these flows are directed to the truck rack oil/water separator (OWS 3). The roof of the truck loading rack directs storm water away from the truck rack equipment and loading operations to perimeter drains and individual catch basins located along the perimeter of the rack. Storm water reaching the perimeter drains and catch basins enters the warehouse catch basin where it is pumped into the terminals water collection system and flows by gravity to the main oil/water separator (OWS 1) along with storm water from the tank farm.

OWS 3 is a baffled American Petroleum Institute (API) model located in the vicinity of the truck loading rack at the Northwest corner of the facility. It has a normal capacity of 3,000 gallons and a design flow rate of 300 gallons per minute (GPM). Absorbent booms are used and replaced regularly to remove oil from the OWS. Discharge from OWS 3 travels through a pipe to the main oil/water separator (OWS 1). OWS 1 is located near the Weymouth Fore river at the Northern portion of the facility and is a baffled American Petroleum Institute (API) model constructed in the 1907. CITGO states that this OWS has a maximum capacity of approximately 500,000 gallons and a calculated design flow rate of 7,600 gallons per minute (GPM). The flow rate was calculated based on a specific gravity of 0.85 for the oil in the influent.

2. Outfall 002

Outfall 002 is an internal outfall consisting of remediated ground water from the portion of the truck loading rack adjacent to Quincy Avenue. The ground water treatment system consists of a carbon adsorption system coupled with particulate filters, an air stripper and the remediation oil/water separator (OWS 2). OWS 2 is a Hydroquip Model AGM25s73v and has a capacity of 471 gallons (plus 73 gallons of recovered oil storage capacity) and a design flow rate of 25 gpm. Outfall 002 discharges to the storm water conveyance system, which is treated by OWS 1 prior to discharging to Weymouth Fore River through Outfall 001.

C. Derivation of Effluent Limits under the Federal CWA and/or the Commonwealth of Massachusetts' Water Quality Standards

The Draft Permit for Citgo Petroleum Corporation includes numeric effluent limitations and requires the development, implementation, and annual review of a SWPPP prepared for the

facility. The effluent parameters in the Draft Permit are discussed in more detail below according to the effluent characteristic(s) being regulated.

1. Flow

The typical treatment technology employed by petroleum bulk storage terminals for storm water runoff is an O/W Separator. This device uses gravity to separate the lower-density oils from water; resulting in an oil phase above the oil/water interface and a heavier particulate phase (sludge) on the bottom of the separator. Accordingly, the sizing of an O/W Separator is based upon the following design parameters: water-flow rate; density of oil to be separated; desired percentage removal of oil; and the operating temperature range.

To ensure proper operation of installed O/W Separators such that the oil and/or particulate phases are not entrained to the waterway, it is important that the flow through the separator be maintained at or below the maximum design flow rate of the separator.

CITGO Petroleum has indicated that the design flow for OWS 3 is 300 gpm. This flow rate is controlled by the discharge pump, which has a rating of 300 gpm. Since the pumping rate does not exceed the maximum design flow rating of the separator, Citgo Petroleum has demonstrated that the flow through OWS 3 is appropriately controlled.

Citgo Petroleum has identified that the maximum design flow rate for OWS 2 is 25 GPM. EPA is using this design flow information to identify the maximum daily effluent flow limit for Outfall 002. The maximum daily flow limit of 25 GPM is continued from the Existing Permit and will be applied to Outfall 002 in the Draft Permit. The flow through OWS 2 is controlled through the operation of a pump located within the separator. The estimated combined pumping rate of both these pumps is 15 gpm. Since the pumping rate of both pumps does not exceed the maximum design flow rating of the separator, Citgo Petroleum has demonstrated that the flow through OWS 2 is appropriately controlled.

The Draft Permit contains a daily maximum flow limit of 7,500 gpm for Outfall 001. This limit has been modified from the limit of 1042 gpm in the Existing Permit based on new information. The limit in the Existing Permit was designed to ensure a six (6) hour retention time assuming a capacity of 400,000 gallons for OWS 1. This retention time is significantly longer than the times provided by current oil/water separator manufacturers, such as Highland Tanks. Since the Existing Permit was issued, the facility has requested a modified flow limit to better reflect the design capacity of the OWS and accommodate the flow from the facility. CITGO calculated a new design flow rate using Stoke's Law, the dimensions of chamber #1 of the OWS, and characteristics of the oil droplets and particles present in the influent. A conservative assumption was made that all separation occurred in the first chamber of OWS 1 due to the difficulty in quantifying the removal of oil and TSS in the remaining chambers. The Material Safety Data Sheets (MSDSs) for the products stored at CITGO indicate that the specific gravity of the oil in the influent could range from 0.72 to 0.84. The facility assumed a specific gravity of 0.85 in calculating the design flow for OWS 1 to represent the worst case scenario for the influent. The specific gravity and diameter of the particles in the influent was approximated by the facility based on the smallest sediment particle removed by the separator. The calculations

identify a maximum design flow rate of 7,500 gpm (see Attachment E). Citgo Petroleum has indicated that the flow through OWS 1 is controlled through the manual operation of a gate valve.

The Draft Permit requires that the facility provide written notification and receive approval by EPA and MassDEP for any proposed changes which have the potential to cause the maximum design flow rate through either OWS to be exceeded.

2. Total Suspended Solids (TSS)

The Draft Permit limits for TSS remains unchanged from the Existing Permit at 30 mg/l and 100 mg/l for the average monthly and maximum daily values, respectively. The TSS limits in the Draft Permit are based upon the limits established in the existing permit in accordance with the anti-backsliding requirements found in 40 CFR §122.44(l). Heavy metals and polynuclear aromatic hydrocarbons are readily adsorbed onto particulate matter and the release of these compounds into the environment can be reduced by regulating the amount of suspended solids discharged.

The limits in the existing permit were developed based upon a BPJ determination. In making this determination, EPA considered the technology guidelines promulgated at 40 CFR Part 423 for the Steam Electric Power Point Source Category for guidance. Steam electric generating facilities, similar to bulk petroleum storage facilities, frequently include the storage of fuel oil on their premises. In developing effluent limits for Steam Electric Source Category, EPA identified TSS as a potential pollutant due to the drainage associated with equipment containing fuel oil and/or the leakage associated with the storage of oil (USEPA, 1982). EPA then considered the level of treatment that could be technologically achieved for TSS using an O/W Separator and set corresponding limits in the guidelines (See 40 CFR Part 423 "low volume waste sources"). Given the similarities between the storage of petroleum products at bulk stations and terminals and the storage of fuel oil at steam electric facilities, EPA is used the same TSS limits established for steam electric facilities for bulk petroleum storage facilities.

The permittee has requested to reduce the frequency of sampling from twice (2) per month to once (1) per month. A review of the DMR results (Attachment B) reveals no permit violations from April 2005 to October 2007. Based on the performance of the facility, EPA has reduced the required sampling frequency to once (1) per month in the Draft Permit.

3. Oil and Grease

The Outfall 001 Draft Permit limit for oil and grease remains unchanged from the Existing Permit at 15 mg/l for the maximum daily value. The oil and grease limit in the Draft Permit is based upon the limit established in the existing permit in accordance with anti-backsliding requirements found in 40 CFR §122.44(l).

The Existing Permit limit was based on state water quality and state certification requirements. The Massachusetts Surface Water Quality Standards, 314 Code of Massachusetts Regulations

("CMR") 4.05(3)(b)(7), state: *These waters shall be free from oil, grease and petrochemicals that produce a visible film on the surface of the water, impart an oily taste to the water or an oily or other undesirable taste to the edible portions of aquatic life, coat the banks or bottom of the water course, or are deleterious or become toxic to aquatic life.* A concentration of 15 mg/l is recognized as the level at which many oils produce a visible sheen and/or cause and undesirable taste in fish (EPA Water Quality Criteria, 1972). A maximum daily limit for oil and grease of 15 mg/l will ensure compliance with state water quality standards and has been included for similar facilities in Massachusetts.

The permittee has requested to reduce the frequency of sampling from twice (2) per month to once (1) per month. A review of the DMR results (Attachment B) reveals no permit violations from April 2005 to October 2007. Based on the performance of the facility, EPA has reduced the required sampling frequency to once (1) per month in the Draft Permit.

4. pH

Massachusetts State Surface Water Quality Standards require the pH of Class SB waters to be within the range of 6.5 to 8.5 standard units (s.u.) and not more than 0.2 units outside of the natural background range. The pH permit limit range of 6.5 to 8.5 as identified in the Draft Permit, which is to be monitored on a monthly basis, has been established in accordance with the State Surface Water Quality Standards. The discharge shall not exceed this pH range unless due to natural causes. In addition, there shall be no change from background conditions that would impair any uses assigned to the receiving water class. A summary of the discharge monitoring data submitted by the facility during the time period of April 2005 to October 2007 is included as Attachment B to this Fact Sheet. A review of this information reveals four instances in which the pH of the discharge was below 6.5 s.u.. These are not permit violations because the Existing Permit contains a report only requirement for pH.

5. Bacteria

The Draft Permit contains quarterly monitoring requirements for enterococcus bacteria. This requirement is based on the pathogen impairment of the Weymouth Fore River and the revised Massachusetts State Surface Water Quality Standards for Class SA waters (314 CMR 4.05(4)(a)(4)).

6. Polynuclear Aromatic Hydrocarbons

Polynuclear Aromatic Hydrocarbons (PAHs) are a group of organic compounds which are found throughout the environment. PAHs are primarily introduced into the environment through the incomplete combustion of organic compounds. PAHs are also present in crude oil and some of the heavier petroleum derivatives and residuals (e.g., No. 2 Fuel Oil and asphalt). Spillage or discharge of these products can serve to introduce PAHs into the environment. PAHs will strongly adsorb to suspended particulates and biota and can also bio-accumulate in fish and shellfish.

There are sixteen (16) PAH compounds identified as priority pollutants under the CWA (See 40 CFR 423 - Appendix A). Group I PAHs are seven well known animal carcinogens. They are: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene. Group II PAHs are the nine priority pollutant PAHs not considered carcinogenic alone, but which can enhance or inhibit the response of the carcinogenic PAHs. They are Acenaphthene, Acenaphthylene, Anthracene, Benzo (g,h,i) perylene, Fluoranthene, Fluorene, Napthalene, Phenanthrene, and Pyrene. Typically, exposure would be to a mixture of PAHs rather than to an individual PAH.

The Existing Permit contained no monitoring requirements for PAHs. However, the Existing Fact Sheet includes the following language:

> *An evaluation of DMRs from 1/31/01 to 7/31/01 reveals that the concentration of PAHs in all cases were below detectable levels. The permittee has requested to eliminate sampling requirements for PAHs. Due to these test results, the PAH requirement has been removed from this permit.*

Based on requirements for other bulk storage facilities, monitoring requirements for Group I PAHs have been reinstated in the Draft Permit for Outfall 001. However, based on the historic below-detection concentration levels of PAHs, monitoring for these parameters is only required once per year. In addition, sampling and analysis will be required to achieve the following Minimum Level (ML) of reporting for each of the PAH compounds identified below:

Group I PAHs:

Benzo (a) anthracene	<0.05 µg/l	Benzo (a) pyrene	<2.0 µg/l
Benzo(b) fluoranthene	<0.1µg/l	Benzo(k) fluoranthene	<2.0 µg/l
Chrysene	<5.0 µg/l	Dibenzo (a,h) anthracene	<0.1 µg/l
Indeno (1,2,3-cd) pyrene	<0.15 µg/l	Napthalene	<0.2 µg/l

The ML is defined as the level at which the entire analytical system gives recognizable mass spectra and acceptable calibration points. This level corresponds to the lower points at which the calibration curve is determined based on the analysis of the pollutant of concern in reagent water

EPA has added naphthalene to the list of PAH compounds to be reported without limits by the facility in the Draft Permit. Naphthalene is considered an important limiting pollutant parameter based upon the prevalence of this compound in petroleum products and its toxicity (i.e., naphthalene has been identified as a possible human carcinogen).

7. Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX)

Refined petroleum products contain numerous types of hydrocarbons. Individual components partition to environmental media on the basis of their physical/chemical properties (e.g., solubility, vapor pressure). Rather than attempt to establish effluent limits for every compound

found in a petroleum release, limits are typically established for the compounds that would be the most difficult to remove as well as demonstrate the greatest degree of toxicity. Generally, the higher the solubility of a volatile organic compound (VOC) in water, the more difficult it is to remove.

VOCs such as benzene, toluene, ethylbenzene, and the three xylene compounds (BTEX) are normally found at relatively high concentrations in gasoline and the light distillates (e.g., diesel fuel) and then at decreasing concentrations in the heavier grades of petroleum distillate products (e.g., fuel oils). Since many petroleum spills involve gasoline or other light distillates, a traditional approach for such spills has been to limit the aggregate parameter of BTEX compounds. This approach partially stems from the availability of information concerning the health effects and physical properties of these compounds as well as the relatively high concentrations at which they are found in gasoline and other light distillates.

Of these four compounds, benzene has one of the highest solubilities, it is one of the most toxic constituents, and is found at relatively high concentrations in the light distillates. The concentration of benzene in gasoline is approximately 20,000 parts per million (Potter, 1998). The concentration in diesel fuel, although several orders of magnitude smaller than that found in gasoline, is still significant from an environmental perspective. The average percent by weight of benzene in diesel fuel is approximately 0.03 percent (Potter and Simmons, 1998) which is equivalent to a concentration of benzene of approximately 300 parts per million. These values are well above the recommended Federal Water Quality Criteria of 0.051 parts per million (or 51 parts per billion) for benzene.

Because of the reasons mentioned above, benzene can be considered one of the most important limiting pollutant parameters found in gasoline or other light distillates. Building on this premise, benzene can be used as an indicator-parameter for regulatory as well as characterization purposes of storm water which comes in contact with light distillate products. The primary advantage of using an indicator-parameter is that it can streamline monitoring efforts while simultaneously maintaining an effective level of environmental protection.

EPA believes that there is a reasonable potential to impact human health and the environment if there was a release of gasoline and/or light distillates. To better regulate the "potential" for gasoline and/or light distillates to come in contact with storm water via ancillary operations at this facility (i.e., such as product spills during loading and unloading operations), EPA has included a quarterly monitoring requirement for BTEX and a maximum daily effluent limit of 51 µg/L for benzene in the Draft Permit.

In establishing the effluent limit for VOCs for Outfall 001 in the Draft Permit, EPA reviewed all appropriate criteria including the most recent recommended Federal Water Quality Criteria and the quarterly monitoring results for BTEX obtained from the discharges of similar facilities. The benzene limit of 51 µg/L is based on the human health criteria associated with the consumption of aquatic organisms (USEPA, 2002). EPA believes that the inclusion of monitoring for BTEX with a limit for benzene is necessary for the protection of human health and to maintain the water quality standards established under Section 303 of the CWA. The Outfall 001 benzene limit has

been decreased from the Existing Permit limit of 500 µg/L. The Existing Permit limit was a technology-based limit and is less stringent than the water quality-based limit.

CITGO Petroleum has been operating a separate carbon treatment system since 1993 to remove the pollutants found in the contaminated ground water which is migrating into the storm water system. The carbon system is providing additional treatment (i.e., beyond that of OWS 2) to help remove the elevated levels of VOCs associated with the earlier gasoline spill. Properly designed carbon treatment systems can remove those VOCs typically found in gasoline contaminated ground water down to the low parts per billion range. Based on the performance of such treatment systems, the Draft Permit includes technology-based maximum daily limits of 5 µg/L for benzene as well as 100 µg/L for the aggregate sum of the BTEX compounds for Outfall 002. These limits are also based on those included in EPA's Remediation General Permit (RGP). The Draft Permit also requires that, at Outfall 002, individual toluene, ethylbenzene, and total xylene concentrations be monitored and reported on a monthly basis.

The effluent limits for Outfall 002 also include a maximum daily limit of 5 mg/L for Total Petroleum Hydrocarbons (TPH). This is a technology-based limit and is also continued from the Existing Permit. TPH, measures the total concentration of all petroleum related hydrocarbon compounds within a specified carbon range (Weisman, 1998). The petroleum related compounds included within this analysis range from compounds with 6 carbon (C_6) atoms to compounds with 25 carbon atoms (C_{25}). The use of TPH concentrations to assess petroleum contamination in soil or water is a common approach implemented by regulatory agencies in the United States (Weisman, 1998).

8. Methyl Tertiary-Butyl Ether (MTBE)

Another potential contaminant of concern found in gasoline is methyl tertiary-butyl ether (MTBE). MTBE is a synthetic compound used as a blending component in gasolines (e.g., oxygenated fuels, reformulated gasolines, and conventional gasolines). Since 1979 it has been used at low levels in gasoline (e.g., concentrations of 2-4 percent by volume) as a replacement to lead to enhance octane levels. MTBE has been used at higher concentrations (e.g, concentrations of 11-15 percent by volume) in some gasoline since 1992 to fulfill the oxygenate requirements established in the 1990 Clean Air Act Amendments. Due to its small molecular size and solubility in water, MTBE moves rapidly into the ground water, faster than do other constituents of gasoline. Because of these physical properties, MTBE has been detected in ground water in a growing number of studies conducted throughout the country. In some instances, these contaminated waters are a source of drinking water.

Since the spill impacting the discharge of remediated groundwater involved gasoline, EPA has included a maximum daily MTBE limit for Outfall 002 in the Draft Permit. Although there is a significant amount of research available regarding the toxicity MTBE, it is currently not listed as a priority pollutant by EPA and as such has not had either aquatic or human health standards developed yet under EPA's water quality program. Monitoring reports from gasoline remediation sites covered under exclusion authorizations demonstrate that using best available technology (e.g., air stripping and/or carbon) a MTBE limit of 70 µg/L can be consistently met

by a properly designed and maintained treatment system. Therefore, EPA has established a technology-based limit for MTBE of 70 µg/L for Outfall 002 in this Draft Permit. This limit is more stringent than the limit of 100 µg/L included in the Existing Permit, which was set in accordance with EPA's Emergency Exclusion Permit. The Draft Permit also includes quarterly monitoring and reporting of MTBE concentrations at Outfall 001.

9. Hydrostatic Test Water Discharges

Occasionally repairs are made at the facility to the tanks and the piping used for the storage and conveyance of petroleum products. To ensure safe working conditions during this maintenance work, storage tanks and/or pipe networks are rigorously cleaned (e.g., "Poly Brushed", "Squeegee Pigged") and certified as being "gas-free." After completing certain maintenance work, the vessels and/or pipe networks may require hydrostatic testing (e.g., to be filled with water and monitored for changes in water levels) before product replacement. The source of water for this testing is municipal water and as a result the discharge may contain residual chlorine. The hydrostatic test water shall be monitored as described below and treated through the O/W Separator prior to being discharged to the Weymouth Fore River. In addition, the flow of hydrostatic test water into the O/W Separator shall be controlled to prevent it from exceeding the maximum design flow rate of the separator.

At a minimum, four (4) representative samples shall be taken of the hydrostatic test water: one (1) grab sample of the influent test water; and three (3) serial-grab samples of the hydrostatic test water effluent. The influent grab sample shall be taken approximately midway through the fill segment of the hydrostatic test procedure. The three (3) effluent serial-grab samples shall be taken over the duration of the entire discharge segment of the hydrostatic test procedure. The first effluent serial-grab sample shall be taken during the initial phase of discharge; the second around the midpoint; and the third near the end of the discharge. The effluent serial-grab samples shall be obtained before discharge into the O/W Separator and/or mixing with any storm water or other non-storm water flow.

These influent and effluent samples shall be analyzed for the following parameters:

1 Total Suspended Solids (TSS)
2 Oil & Grease (O&G)
3 pH
4 Dissolved Oxygen (DO)
5 Total Residual Chlorine
6 BTEX
7 MTBE
8 PAHs (16 compounds)

Testing for total residual chlorine is only required when potable water or a similar source of water which is likely to contain a residual chlorine concentration is used for hydrostatic testing. Testing for MTBE is only required if the tank undergoing testing was recently (i.e., within three years of the proposed testing date) used to store gasoline.

During discharge (i.e., approximately at the same time the three effluent grab samples are taken), the flow exiting through the O/W Separator and outfall should be observed in order to prevent the inadvertent release of hydrocarbons to the receiving water(s). In the event that there is evidence of such a release (e.g., visible oil sheen and/or noticeable increase in turbidity of discharge water), the permittee shall immediately halt the discharge of hydrostatic test water and take steps to correct the problem.

Sampling of the above parameters is needed to provide adequate characterization of the influent and effluent hydrostatic test water and to identify whether there are any contaminant residuals present in the hydrostatic test water which might require the conditions in the Draft Permit to be modified or reopened.

The permittee shall submit a letter/report to EPA and the MassDEP, summarizing the results of the transfer within forty-five (45) days of completion of the test. This report shall contain: the date(s) of hydrostatic test water transfer; the source of the test water; the volume of test water transferred; a copy of the analytical results identifying the detection limits and associated quality assurance/quality control information for all of the discharge monitoring required in the Draft Permit; and a brief discussion of the overall test results and how they relate to the discharge parameters and their respective effluent limits identified in the Draft Permit. Any changes to these procedures must be approved by EPA and the State prior to their implementation.

10. Tank-Bottom and Bilge Water

The bottom of many petroleum product storage tanks may contain a layer of water that has separated from the stored petroleum product due to the density difference between the product and water. As this water coalesces and then settles to the bottom of the tank, compounds including BTEX and PAHs found in the product above it are able to partition and dissolve into the water. The partitioning and dissolution allows the concentrations of some of the more soluble and denser petroleum components to reach toxic levels. Facility operators drain this layer of water to prevent transfer with the finished product as well as to free up valuable storage space. Whereas storm water contacts only those hydrocarbons spilled on the ground and then only for short periods of time; tank bottom and bilge water remains in intimate proximity with petroleum derivatives for prolonged periods of time, allowing toxic pollutants to dissolve into the aqueous phase. EPA Region I considers both tank-bottom and bilge water "process wastewater", since soluble toxic materials can partition from the petroleum product into the water over time. To protect the Weymouth Fore River from toxic pollutants dissolved in tank-bottom and bilge water, EPA is prohibiting the permittee from discharging any tank-bottom or bilge water alone or in combination with storm water or other wastewater.

11. Storm Water Pollution Prevention Plan (SWPPP)

This facility engages in activities which could result in the discharge of pollutants to waters of the United States either directly or indirectly through storm water runoff. These operations include at least one of the following in an area potentially exposed to precipitation or storm water: material storage, in-facility transfer, material processing, material handling, or loading and unloading. To control the activities/operations, which could contribute pollutants to waters

of the United States, potentially violating the State's Water Quality Standards, the Draft Permit requires the facility to develop, implement, and maintain a Storm Water Pollution Prevention Plan (SWPPP) containing best management practices (BMPs) appropriate for this specific facility (See Sections 304(e) and 402(a)(1) of the CWA and 40 CFR §125.103(b)). Specifically, at this facility, routine maintenance and cleaning of the oil/water separators for both sludge layer and oil layer are examples of material storage, processing and handling operations that shall continue to be included in the SWPPP.

The goal of the SWPPP is to reduce, or prevent, the discharge of pollutants through the storm water system. The SWPPP requirements in the Draft Permit are intended to provide a systematic approach by which the permittee shall at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit. The SWPPP shall be prepared in accordance with good engineering practices and identify potential sources of pollutants, which may reasonably be expected to affect the quality of storm water discharges associated with industrial activity from the facility. The SWPPP, upon implementation, becomes a supporting element to any numerical effluent limitations in the Draft Permit. Consequently, the SWPPP is as equally enforceable as the numerical limits.

This process involves the following four main steps:

(1) Forming a team of qualified facility personnel who will be responsible for developing and updating the SWPPP and assisting the plant manager in its implementation;
(2) Assessing the potential storm water pollution sources;
(3) Selecting and implementing appropriate management practices and controls for these potential pollution sources; and
(4) Reevaluating, periodically, the effectiveness of the SWPPP in preventing storm water contamination and in complying with the various terms and conditions of the Draft Permit.

VII. Essential Fish Habitat

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Sect. 1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Service (NMFS) if EPA's action or proposed actions that it funds, permits or undertakes, "may adversely impact any essential fish habitat." 16 U.S.C. Sect. 1855(b). The Amendments broadly define "essential fish habitat" (EFH) as "waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 16 U.S.C. Sect. 1802(10). Adverse impact means any impact which reduces the quality and/or quantity of EFH. 50 CFR Sect. 600.910(a). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative or synergistic consequences of actions. Essential Fish Habitat is only designated for fish species for which federal Fisheries Management Plans exist. 16 U.S.C. Sect. 1855(b)(1)(A). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

A review of the relevant essential fish habitat information provided by NMFS indicates that essential fish habitat has been designated for 23 managed species within the NMFS boundaries encompassing the outfall location. A copy of the managed species within the EFH is included in Attachment F of this Fact Sheet. EPA has concluded that the permitted discharge will not likely adversely impact the EFH and the managed species identified for this general location. This conclusion is based on the amount and frequency of the discharge, as well as effluent limitations and other permit requirements that are identified in this Fact Sheet. These factors are designed to be protective of all aquatic species, including those with EFH designations.

EPA has determined that no EFH consultation with NMFS is required because the proposed discharge will not adversely impact the EFH. If adverse impacts are detected as a result of this permit action, NMFS will be notified and an EFH consultation will promptly be initiated. A copy of the Draft Permit has been provided to the NMFS for review and comment.

VIII. Endangered Species Act

Section 7(a) of the Endangered Species Act of 1973, as amended (ESA) grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical (a "critical habitat"). The ESA requires every Federal agency, in consultation with and with the assistance of the Secretary of Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The United States Fish and Wildlife Service (USFWS) administers Section 7 consultations for freshwater species. The National Marine Fisheries Service (NMFS) administers Section 7 consultations for marine species and anadromous fish.

EPA has reviewed the federal endangered or threatened species of fish, wildlife, or plants for Norfolk County, Massachusetts to see if any such listed species might potentially be impacted by the re-issuance of this NPDES permit. The listed species for Norfolk County include Kemp's Ridley Sea Turtle and the Loggerhead Sea Turtle. EPA believes the proposed limits are sufficiently stringent to assure that water quality standards will be met and to ensure protection of aquatic life and maintenance of the receiving water as an aquatic habitat. The Region finds that adoption of the proposed permit is unlikely to adversely affect any threatened or endangered species or its critical habitat. If adverse effects do occur as a result of this permit action, or if new information becomes available that changes the basis for this conclusion, then EPA will notify and promptly initiate consultation with both USFWS and NMFS. A copy of the Draft Permit has been provided to both USFWS and NMFS for review and comment.

IX. Monitoring

The permittee is obligated to monitor and report sampling results to EPA and the MassDEP within the time specified within the permit. Timely reporting is essential for the regulatory agencies to expeditiously assess compliance with permit conditions.

X. State Certification Requirements

EPA may not issue a permit unless the Commonwealth of Massachusetts Department of Environmental Protection with jurisdiction over the receiving waters certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The staff of the Commonwealth of Massachusetts Department of Environmental Protection has reviewed the draft permit, and advised EPA that the limitations are adequate to protect water quality. EPA has requested permit certification by the State pursuant to 40 CFR 124.53 and expects that the draft permit will be certified.

XI. Comment Period, Hearing Requests, and Procedures for Final Decisions

All persons, including applicants, who believe any condition of the Draft Permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to Sara Green, U.S. EPA, Office of Ecosystem Protection**,** Industrial Permits Branch, 1 Congress Street, Suite 1100, Boston, Massachusetts 02114-2023. Any person, prior to such date, may submit a request in writing for a public hearing to consider the Draft Permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public meeting may be held if the criteria stated in 40 C.F.R. § 124.12 are satisfied. In reaching a final decision on the Draft Permit, the EPA will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period, and after any public hearings, if such hearings are held, the EPA will issue a Final Permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Within 30 days following the notice of the Final Permit decision, any interested person may submit a petition for review of the permit to EPA's Environmental Appeals Board consistent with 40 C.F.R. § 124.19.

XII. EPA Contact

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays from:

Sara Green, EPA New England – Region I
One Congress Street, Suite 1100 (CIP)
Boston, MA 02114-2023
Telephone: (617) 918-1574 FAX: (617) 918-0574
Email: green.sara@epa.gov

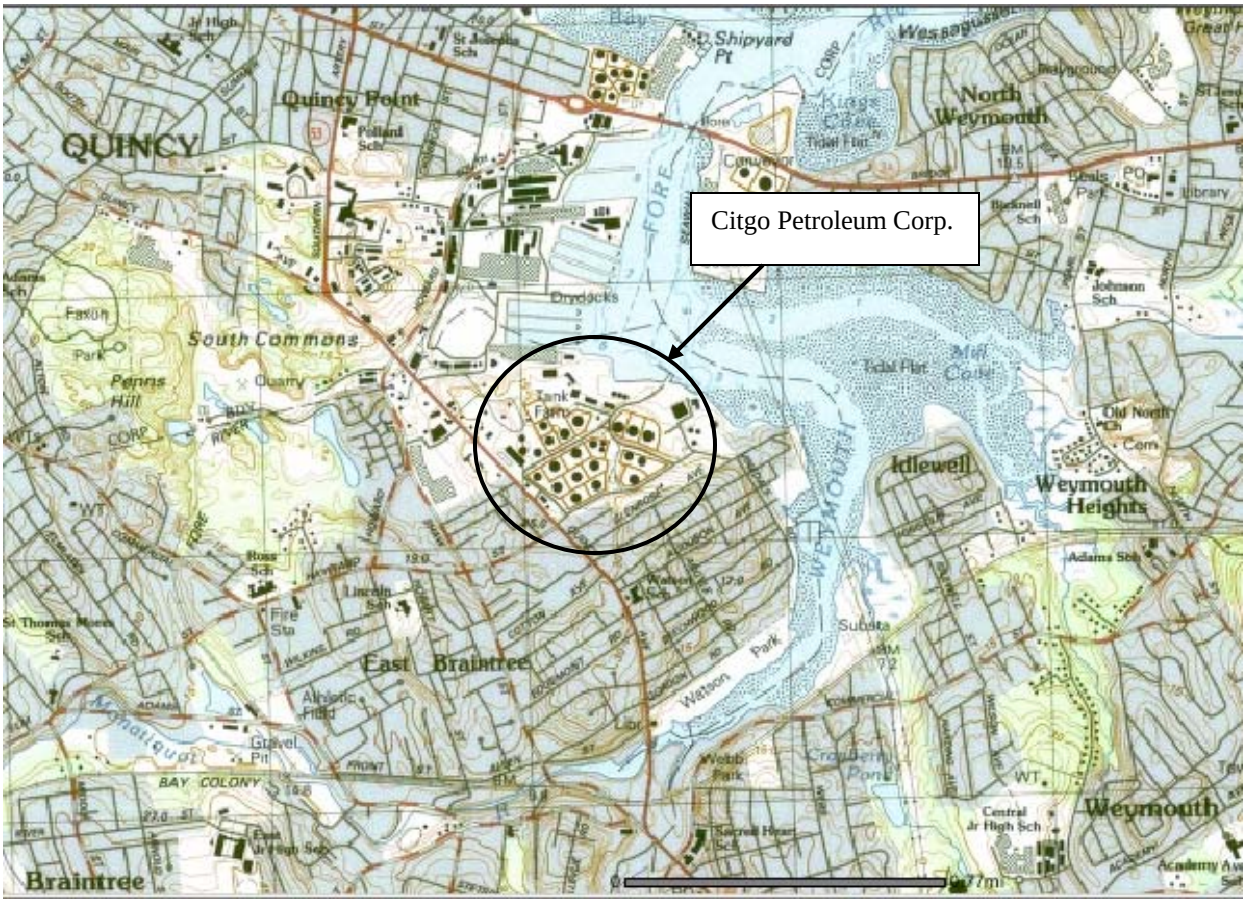
Paul Hogan, Massachusetts Department of Environmental Protection
Division of Watershed Management, Surface Water Permit Program
627 Main Street, Second Floor
Worcester, MA 01608

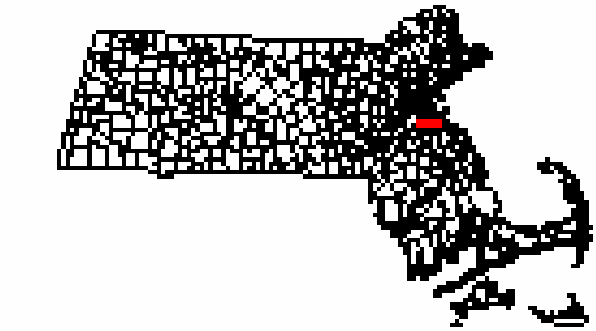
Telephone: (508) 767-2796
Email: paul.hogan@state.ma.us

2/26/2008

Stephen S. Perkins, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

ATTACHMENT A
Citgo Petroleum Corp (MA0004782)
Site Locus Map





Source: MassGIS USGS Topographic Maps
United States December 1995

ATTACHMENT B
CITGO Petroleum Corp. (MA0004782)
OUTFALL 001 - SAMPLING RESULTS
April 2005 THROUGH October 2007

MONITORING PERIOD END DATE	Flow Rate (GPM)		Flow total (Mgal/month)	pH (s.u.)	TSS (mg/l)		Oil and Grease
	Daily Max	Monthly Average	Max	Daily Max	Daily Max	Monthly Average	Daily Max
31-Oct-07	153.8	22.7	1013.1	6.4	5	2.5	0
30-Sep-07	19.1	223.6	322	7.1		0	0
31-Aug-07	-	-	-	-	-	-	-
31-Jul-07	173.7	22.4	1000	6.5	-	0	0
30-Jun-07	337	49.6	14557.2	6.5	8	7	0
31-May-07	507	71	22615	6.4	-	8	0
30-Apr-07	1015	239	10325	6.8	16	11	0
31-Mar-07	153.2	751.2	33536	6.6	9.5	11	0
28-Feb-07	46	470	1849	6.8	-	8	0
31-Jan-07	241	67.7	10780.1	6.9	5	2.5	0
31-Dec-06	171	58	2605	6.7	-	6	0
30-Nov-06	1088.3	178.9	1567.2	6.6	7	3.5	0
31-Oct-06	787	90	35114	6.9	22	14	0
30-Sep-06	104	32	1392	6.6	-	0	0
31-Aug-06	331.4	60.8	14792	6.5	7.5	15	0
31-Jul-06	119	710	31713	6.8	5	2.5	0
30-Jun-06	1107	337.5	14580	7.7	5	2.5	0
31-May-06	1155.9	276.9	12362	6.7	-	0	0
30-Apr-06	24.7	89.9	1068.1	6.7	5.5	11	0
31-Mar-06	362.9	50.5	16198	6.3	0	0	0
28-Feb-06	385	146	16637	6.5	10	10	0
31-Jan-06	571	189	25489	6.5	5	2.5	0
31-Dec-05	145.7	59.7	6503.2	6.6	7	3.5	0
30-Nov-05	227.1	50.1	9808.7	6.5	9	4.5	0
31-Oct-05	313.7	127.2	13551	6.7	7	3.5	0
30-Sep-05	382	62	16514	6.7	9	4.5	7.7
31-Aug-05	374	60	16697	6.6	84	23	0
31-Jul-05	186.4	29.6	8051.1	6.3	5	-	5
30-Jun-05	65.6	11.4	2834.9	7.8	9	6.5	5
31-May-05	465.9	86.6	20798.6	6.7	7	5.5	5
30-Apr-05	106.3	34.7	4592.5	6.8	5	5	5.71

Permit Limits	**1042**	**Report**	**Report**	**Report**	**100**	**30**	**15**
Minimum	19.1	11.4	322	6.3	0	0	0
Maximum	1155.9	751.2	35114	7.8	84	23	7.7
Average	370.66	155.27	12295.52	6.71	10.98	5.97	0.95
Standard Deviation	336.18	188.66	10111.83	0.34	16.49	5.35	2.20
# measurements	30	30	30	30	23	29	30
# exceed limits	3	NA	NA	NA	0	0	0

'ND' denotes No Discharge '-' denotes data unavailable

CITGO Petroleum Corp. (MA0004782)
OUTFALL 001 - SAMPLING RESULTS
March 2003 THROUGH September 2007

MONITORING PERIOD END DATE	METHYL TERT-BUTYL ETHER (MTBE) (µg/l)	BENZENE (µg/l)	ETHYLBENZENE (µg/l)	TOLUENE (µg/l)	XYLENE (µg/l)
30-Sep-07	0	0	0	0	0
30-Jun-07	0	9.02	0	0	7.09
31-Mar-07	7.8	16.4	0	14.1	13.2
31-Dec-06	0	9.4	0	0	0
30-Sep-06	16.8	0	0	0	0
30-Jun-06	82	10.5	0	0	11.7
31-Mar-06	100	12.2	0	6.5	13.8
31-Dec-05	29.7	0	0	0	0
30-Sep-05	735	81.1	132	519	747
30-Jun-05	599	0	0	0	0
31-Mar-05	54.4	24.8	7.15	8.02	25.3
31-Dec-04	99.3	10	21.1	69.5	154
30-Sep-04	26.3	7.58	0	0	0
30-Jun-04	370	15.8	11.8	70.8	95.6
31-Mar-04	486	18.4	0	5.45	18.8
31-Dec-03	295	5.28	0	14.9	48.5
30-Sep-03	54.3	5.47	0	0	0
30-Jun-03	262	17.9	7.2	13.5	37.5
31-Mar-03	575	0	0	0	28.7

Permit Limits	**Report**	**500**	**Report**	**Report**	**Report**
Minimum	0	0	0	0	0
Maximum	735	81.1	132	519	747
Average	199.61	12.83	9.43	37.99	63.22
Standard Deviation	239.88	18.08	30.20	118.44	170.14
# measurements	19	19	19	19	19
# exceed limits	NA	0	NA	NA	NA

‘ND’ denotes No Discharge ‘-’ denotes data unavailable

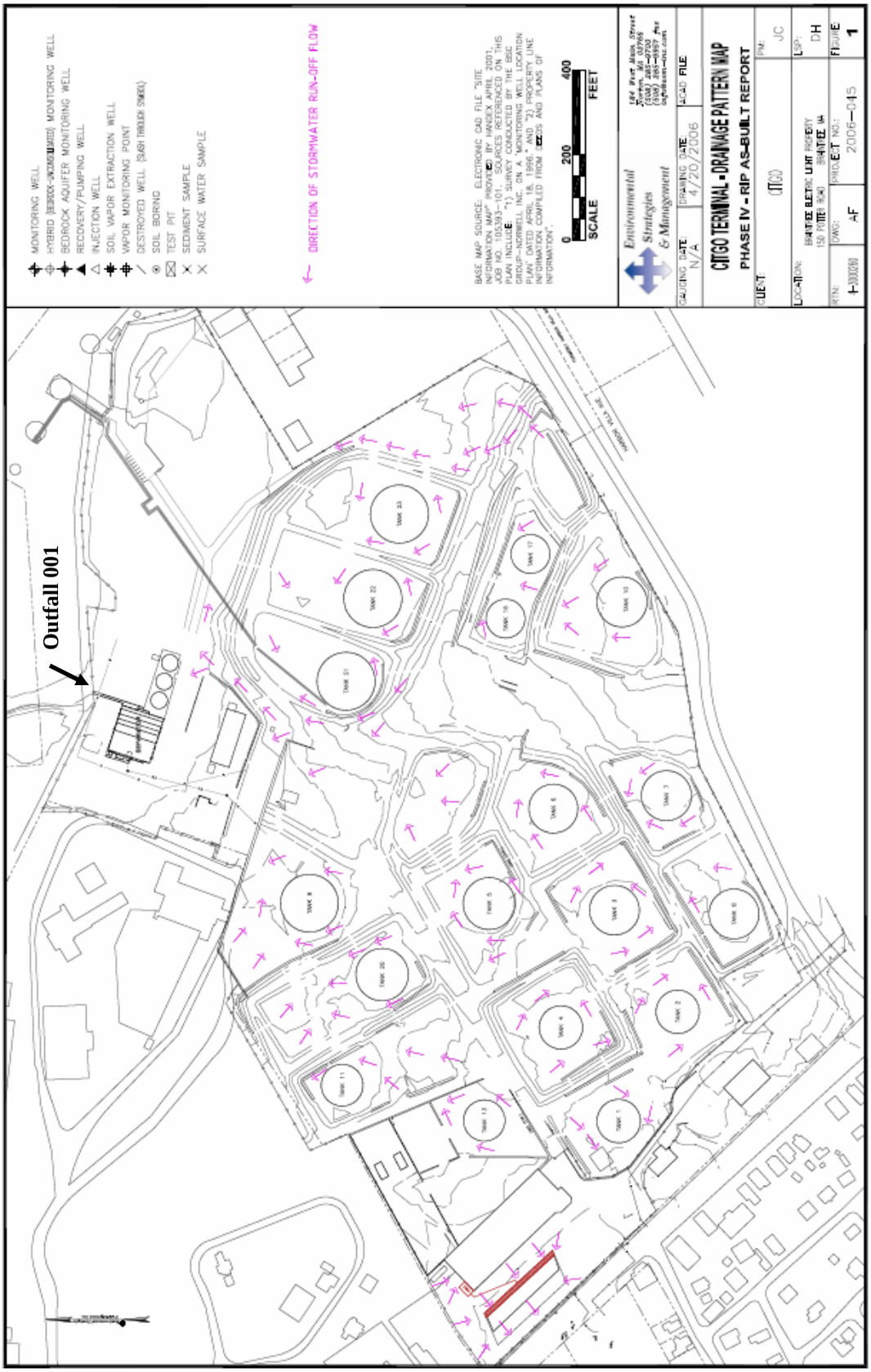
CITGO Petroleum Corp. (MA0004782)
Groundwater Remediation (Outfall 002) - SAMPLING RESULTS
April 2005 THROUGH October 2007

MONITORING PERIOD END DATE	Flow (GPM)		Total Petroleum Hydrocarbons (TPH) (mg/l)	METHYL TERT-BUTYL ETHER (MTBE) (µg/l)	BENZENE (µg/l)	Total BTEX (µg/l)
	Daily Max	Monthly Average	Daily Max	Daily Max	Daily Max	Daily Max
31-Oct-07	1.27	1.27	0.2	2	2	
30-Sep-07	1.36	1.36	0	7	0	0
31-Aug-07	-	-	-	-	-	
31-Jul-07	1.48	1.48	0	15	0	
30-Jun-07	1.21	1.21	0	43	0	0
31-May-07	1.52	1.52	0.2	80	2	
30-Apr-07	3.2	3.2	0.2	2	2	
31-Mar-07	2.58	2.58	0	7	0	0
28-Feb-07	1.27	1.27	0	0	0	
31-Jan-07	1.67	1.67	0	13	0	
31-Dec-06	1.18	1.18	0	0	0	-
30-Nov-06	1.57	1.57	0	3	0	
31-Oct-06	0.39	0.39	0	8	0	
30-Sep-06	0.54	0.54	0	2	0	0
31-Aug-06	1.08	1.08	0	3	0	
31-Jul-06	1.16	1.16	0	40	0	
30-Jun-06	1.4	1.4	0	0	0	-
31-May-06	1.73	1.73	0	7	0	
30-Apr-06	0.49	0.49	0	0	0	
31-Mar-06	0.4	0.4	0	0	0	0
28-Feb-06	1.37	1.37	0	0	0	
31-Jan-06	1.27	1.27	0	14	0	
31-Dec-05	1.46	1.46	0	4	0	0
30-Nov-05	-	-	0	3	0	
31-Oct-05	2.08	2.08	0	6	0	
30-Sep-05	1.59	1.59	0	99	0	0
31-Aug-05	0.99	0.99	0	21	0	
31-Jul-05	1.16	1.16	0.2	2	2	
30-Jun-05	2.24	2.24	0	100	0	0
31-May-05	3.3	3.3	0	96	0	
30-Apr-05	5.3	5.3	0	60	0	

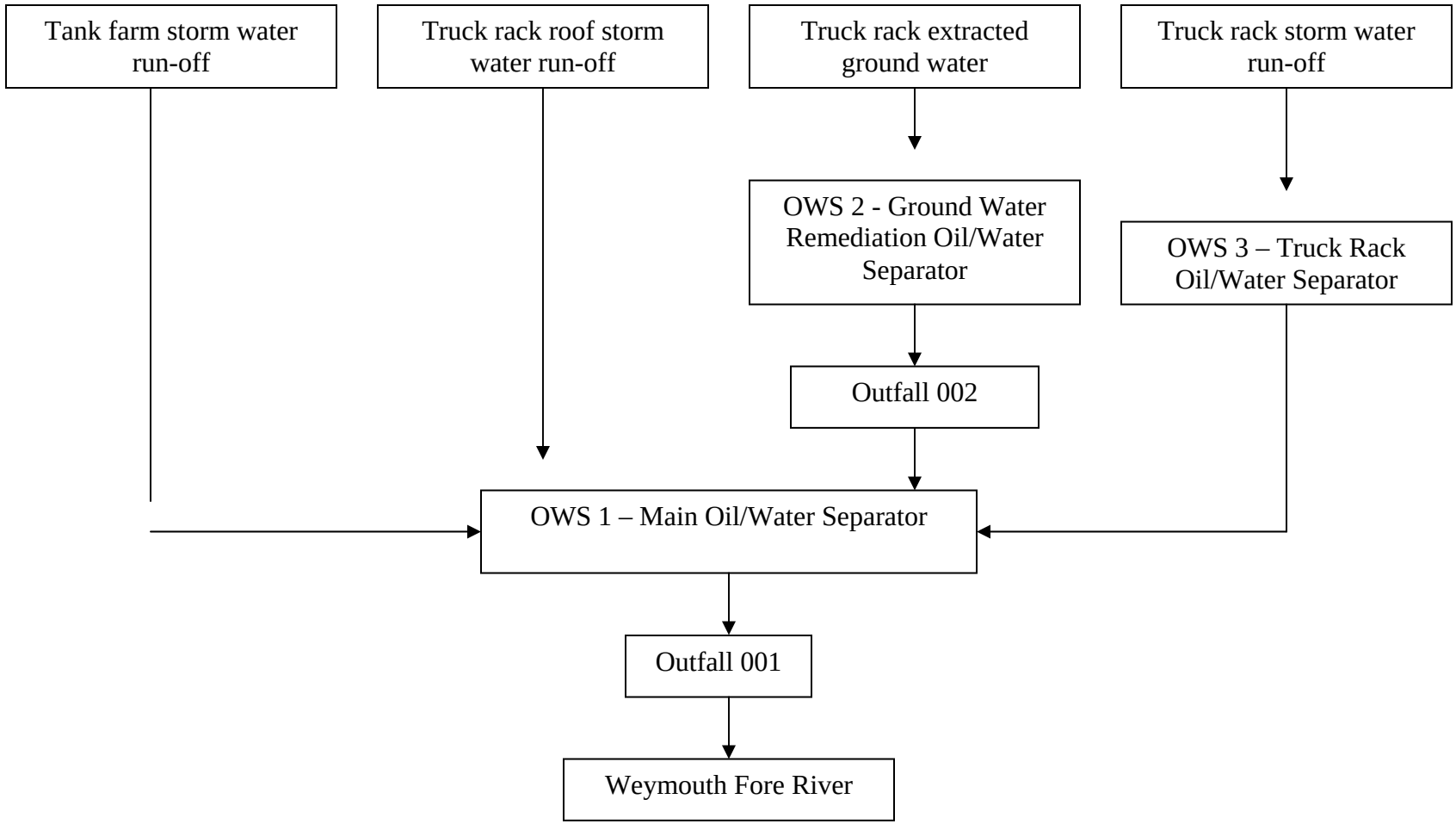
Permit Limits	**25**	**Report**	**5**	**100**	**5**	**100**
Minimum	0.39	0.39	0	0	0	0
Maximum	5.3	5.3	0.2	100	2	0
Average	1.60	1.60	0.03	21.23	0.27	0.00
Standard Deviation	1.00	1.00	0.07	32.31	0.69	0.00
# measurements	29	29	30	30	30	8
# exceed limits	0	NA	0	0	0	0

'ND' denotes No Discharge '-' denotes data unavailable

ATTACHMENT C
Citgo Petroleum Corporation (MA0004782)
Site Plan and Drainage Diagram



ATTACHMENT D
Citgo Petroleum Corp. (MA0004782)
Water Line Diagram



ATTACHMENT E
Citgo Petroleum Corp. (MA0004782)
Design Flow Calculations for Oil/Water Separator #1

Assumptions

* Assume all separation occurs in chamber #1

Dimensions of OWS Chamber #1:
Length of chamber – 46 feet
Length silt curtain – 36 feet
Depth – 13 inches = 1.083 feet
Width – 98 feet (two chambers each 49 feet)
Total volume of chamber – 36,530 gallons
Volume above silt curtain – 28588 gallons

Influent characteristics:
Specific gravity water (ρ_w) – 1.0 g/cm^3
Viscosity (at 40°F) (μ) – 0.0155 g/cm-sec
Specific gravity oil – 0.84 g/cm^3
Oil droplet diameter – 0.015 cm
Specific gravity particle – 2.6 g/cm^3
Particle diameter – 0.002 in = 0.00508 cm

Calculations

Stoke's Equation: $Vt = [gd^2(\rho_w-\rho)]/[18\mu]$

Oil Droplet Calculations

$$Vt = \frac{981(cm/\sec^2)*(0.015cm)^2*(1-0.85)(g/cm^3)}{18*0.0155(g/cm\cdot\sec)} = 0.119 \text{ (cm/sec)}$$

$$Vt = 0.234 \text{ feet/min}$$

$$\text{Time to reach surface} = \frac{1.083\,feet}{0.234(feet/\min)} = 4.64 \text{ min}$$

$$\text{Would reach surface with flow rate up to} \frac{36530 gallons}{4.64 \min} = 7877 \text{ gpm}$$

Particle Calculations

$$Vt = \frac{981(cm/\sec^2)*(0.00508cm)^2*(1-2.6)(g/cm^3)}{18*0.0155(g/cm\cdot\sec)} = 0.145 \text{ (cm/sec)}$$

$$Vt = 0.286 \text{ feet/min}$$

$$\text{Time to settle} = \frac{1.083\,feet}{0.286(feet/\min)} = 3.79 \text{ min}$$

$$\text{Would settle with flow rate up to} \frac{28588 gallons}{3.79 \min} = 7542 \text{ gpm}$$

ATTACHMENT F
Citgo Petroleum Corp. (MA0004782)
Summary of Essential Fish Habitat (EFH) Designation

Outfall 001 - 10' x 10' Square Coordinates

Boundary	North	East	South	West
Coordinate	42°20.0' N	70°50.0' W	42°10.0' N	71°00.0' N

Square Description (i.e. habitat, landmarks, and coastline markers): Waters within the Atlantic Ocean within Massachusetts Bay and within Boston Harbor within the square affecting from north of Black Rock Beach in Cohasset, MA., to Long Island Bridge in Quincy, MA., and including off of Quincy, MA., Hull, MA. These waters also affect the following islands: Peddocks, Long, Gallops, Spectacle, Lovell, Georges, Hangman, Rainsford, southern Great Brewster, and the northwest tip of Thompson, along with Quincy Bay. Also affected include: Worlds End, Planters Hill, Bumkin I., Sheep I., Nantasket Beach, Strawberry Ledge, Harding Ledge, Thieves Ledge, Ultonia Ledge, Pt. Allerton, Spinnaker I., Grape I., Slate I., Hingham Harbor, Hingham MA., Black River, Weymouth, MA., N. Weymouth, MA., Weymouth Fore River, Quincy Pt., Town River Bay, Houghs Neck, and Moon Head.

Species	**Eggs**	**Larvae**	**Juveniles**	**Adults**
Atlantic Cod (*Gadus morhua)*	X	X	X	X
Haddock (*Melanogrammus aeglefinus)*	X	X		
Pollock (*Pollachius virens)*	X	X	X	X
Whiting (*Merluccius bilinearis)*	X	X	X	X
Offshore hake (*Merluccius albidus)*				
Red hake (*Urophycis chuss*)	X	X	X	X
White hake (*Urophycis tenuis)*	X	X	X	X
Redfish (*Sebastes fasciatus)*	n/a			
Witch flounder (*Glyptocephalus cynoglossus)*				
Winter flounder (*Pleuronectes americanus)*	X	X	X	X
Yellowtail flounder (*Pleuronectes ferruginea)*	X	X	X	X
Windowpane flounder (*Scopthalmus aquosus)*	X	X	X	X
American Plaice (Hippoglossoides platessoides)	X	X	X	X
Ocean pout (*Macrozoarces americanus)*	X	X	X	X
Atlantic halibut (*Hippoglossus hippoglossus)*	X	X	X	X
Atlantic sea scallop (*Placopecten magellanicus)*	X	X	X	X
Atlantic sea herring (*Clupea harengus)*		X	X	X
Monkfish (*Lophius americanus)*				
Bluefish (*Pomatomus saltatrix)*			X	X
Long finned squid (*Loligo pealei)*	n/a	n/a	X	X
Short finned squid (*Illex illecebrosus)*	n/a	n/a	X	X
Atlantic butterfish (*Peprilus triacanthus)*	X	X	X	X
Atlantic mackerel (*Scomber scombus*)	X	X	X	X
Summer flounder (*Paralicthys denatatus)*				X

Scup (*Stenotomus chrysops)*	n/a	n/a	X	X
Black sea bass (*Centropistus striata)*	n/a		X	X
Surf clam (*Spisula solidissima)*	n/a	n/a	X	X
Ocean quahog (*Artica islandica)*	n/a	n/a		
Spiny dogfish (*Squalus acanthias)*	n/a	n/a		
Tilefish (*Lopholatilus chamaeleonticeps)*				
Bluefish tuna (*Thunnus thynnus)*			X	X